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PAYROLL TAX EVASION

by

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A B S T R A C T

Assuming, as is generally the case, that payroll taxes are imposed on both employers and employees (the latter's taxes being withheld at the source by employers) and that taxes are levied at a flat rate on payroll up to a certain ceiling per employee, this paper addresses the employer's decision to evade payroll taxes by underreporting his actual employment level. The paper examines the effects of independent and interrelated tax parameter variations on declared employment, tax payments and the amount of tax evaded, and compares the amount evaded under the present system with that evaded under an alternative system where responsibility for tax collection is delegated to the employees.

I. INTRODUCTION

The tax evasion literature, initiated by Allingham and Sandmo (1972), has mainly been concerned with the individual's decision to evade taxes through the underreporting of actual income. However, some attempts have recently been made to model the firm's decision to evade taxes, such as the evasion of sales taxes by underreporting actual revenue (Marrelli, 1984, Panagariya and Narayana, 1988), the evasion of profit taxes by overstating actual production costs (Kreutzer and Lee, 1986, Wang and Conant, 1988), or the evasion of withholding taxes by understating actual wage payments (Yaniv, 1988, Hagedorn, 1989).

This paper introduces the issue of payroll tax evasion. Taxes on payrolls, levied in most countries to finance social security programs, have grown markedly in the U.S. since the end of World War II. They rank second to the individual income tax in importance, accounting for about one third of the federal budget receipts. They are levied at a flat rate on payroll up to a certain ceiling per employee, with no exemptions or deductions. They are usually collected from both employees and employers, where the employees' share is withheld at the source by employers. Employees do not file a return. The reporting of earnings (and employment) is handled entirely by the employer. Hence, both the employees' and the employer's taxes can be evaded by underreporting actual taxable payroll.

Addressing this possibility, Section II of the paper sets up the basic framework for the analysis of the evasion decision under competitive labor market conditions. Since the social security administration might be able to detect the competitive wage rate with negligible costs, a dishonest (but rational) employer would apparently choose to evade payroll taxes by underreporting his actual number of employees rather than by underreporting the actual wage paid (or both). Declared employment would thus be perceived as the relevant decision variable for the employer. Section III of the paper proceeds with examining the effects of independent and interrelated tax parameter variations on declared employment, tax payments and the amount of tax evaded. Section IV compares the amount evaded under the present system with that evaded under an alternative system where the responsibility for tax collection is delegated to the employees. Section V concludes with some related remarks.

II. THE MODEL

Consider a competitive employer facing a fixed wage rate, w, per worker employed over a given period of time, who is required by social security regulations to contribute to the government a proportion t_r of his payroll up to a certain ceiling per employee, $c(<w)$, as well as to withhold and remit to the government a proportion t_e of his employees' earnings (up to c per employee) as their own contribution. Complying with this requirement, the employer's net profits, π^m, will be

$$\pi^m = V(N) - (w+t_r c)N, \tag{1}$$

where N denotes the actual number of employees and V(N) indicates the value of output, produced at decreasing marginal rates $[V'(N)>0$ and $V''(N)<0]$ by labor input only.

Suppose, however, that the employer considers the possibility of remitting to the government, via understating his true employment level, less than the amount due. Cheating the government would expose him, of course, to the risk of being detected and punished. Denoting the declared number of employees by $L(\leq N)$, the employer's net profits if not detected, π^{nd}, will be

$$\pi^{nd} = V(N) - wN - t_r cL + t_e c(N-L) =$$

$$V(N) - wN - c(tL - t_e N), \tag{2}$$

where $t(=t_e+t_r)$ denotes the overall payroll tax rate. If, on the other hand, his fraudulent behavior is detected, the employer will have to pay a penalty which is a multiple $\delta>1$ of evaded taxes, $tc(N-L)$. His net profits if detected, π^d, will thus be

$$\pi^d = V(N) - wN - c(tK - t_e N), \tag{3}$$

where $K = \delta N - (\delta-1)L > N$. Suppose furthermore that the employer is risk-averse, that his utility function, U, has net profits as its only argument and that he chooses L* and N* so as to maximize the expected utility of his prospect, $EU(\pi) = (1-p)U(\pi^{nd}) + pU(\pi^d)$, where p denotes the (exogenously given) probability of being detected. The first-order conditions for an interior maximum will then be

$$\frac{\partial[EU(\pi)]}{\partial L} = ct[-(1-p)U'(\pi^{nd}) + (\delta-1)pU'(\pi^d)] = 0, \tag{4}$$

implying that $L^*<N$ if $p\delta<1$,[1] and

$$\frac{\partial[EU(\pi)]}{\partial N} = [V'(N) - (w-t_e c)]EU'(\pi) - \delta tcpU'(\pi^{nd}) = 0. \tag{5}$$

However, substituting (4) into (5) reveals that at the optimum

$$\delta p U'(\pi^{d})[V'(N) - (w+t_{r}c)] = 0. \quad (6)$$

Hence, the actual employment decision is independent of tax evasion as long as the latter is optimal. The inverse, however, does not hold.

III. TAX PARAMETER VARIATIONS

We begin by assuming that actual employment is predetermined (relaxing this assumption in a later stage of the discussion) and consider first the effects on evasion of variations in the payroll tax rates. Totally differentiating (4) with respect to L^* and t_e, the employer's response to a change in his employees' tax rate is given by

$$\frac{dL^*}{dt_e} = \frac{N-L}{t} > 0. \quad (7)$$

Hence, an increase in t_e would unambiguously increase declared employment.[2] Consequently, tax payments, tcL, would rise, but evaded taxes would remain unchanged since

$$\frac{d[tc(N-L)]}{dt_e} = c(N-L - t\frac{dL}{dt_e}) = 0. \quad (8)$$

Not only do tax payments increase following a rise in t_e, but the employer in fact hands the increased amount withheld over to the government![3]

However, it is reasonable to assume that some tie exists between the tax rates imposed on the employer and the employees, so that t_r becomes a function of t_e:

$$t_r = \phi(t_e). \quad (9)$$

Substituting (9) into (4) and totally differentiating with respect to L^* and t_e we obtain

$$\frac{dL^*}{dt_e} = \frac{c^2t(1-p)U'(\pi^{nd})}{\Omega}\{[N - (1+\phi')K]R_A(\pi^{d}) -$$

$$[N - (1+\phi')L]R_A(\pi^{nd})\}, \quad (10)$$

where $R_A(\pi) = -U''(\pi)/U'(\pi) > 0$ is the Arrow-Pratt absolute risk-aversion measure and $\Omega = c^2t^2[(1-p)U''(\pi^{nd}) + (\delta-1)^2pU''(\pi^{d})] < 0$ is the second-order condition for the maximization of expected utility. Under the accepted assumption of decreasing absolute risk-aversion $[R_A(\pi^{d}) >$

$R_A(\pi^{nd})]$, the sign of (10) depends on the specific relationship existing between the payroll tax rates (i.e., the value of ϕ'). Of particular interest is the case where a change in t_e is accompanied by a "compensated" equal percentage-point and inverse-related change in t_r so as to keep the overall payroll tax rate, t, unchanged. That is, the case where $t_r + t_e$ = constant, which implies that $\phi' = -1$. The sign of (10) will then be negative[4], implying that a "compensated" increase in the employees' tax rate would decrease declared employment and tax payments and increase the amount of tax evaded. It thus follows that tax payments will be higher and evaded taxes lower the greater the share of the overall tax liability borne by the employer. Notice finally that the sign of (10) will also be negative for tax rate relationships satisfying $\phi'<-1$, but ambiguous otherwise.

Consider now the employer's response to a change in the taxable payroll ceiling. Totally differentiating (4) with respect to L* and c we obtain

$$\frac{dL^*}{dc} = -\frac{ct(1-p)U'(\pi^{nd})}{\Omega}[(tK-t_eN)R_A(\pi^d) - (tL-t_eN)R_A(\pi^{nd})] > 0, \qquad (11)$$

regardless of the sign of $tL-t_eN$, and

$$\frac{d[tc(N-L)]}{dc} = t(N-L - c\frac{dL}{dc}) = \frac{c^2t^2t_rN(1-p)U'(\pi^{nd})}{\Omega}[R_A(\pi^d) - R_A(\pi^{nd})] < 0. \qquad (12)$$

An increase in c would thus increase declared employment and tax payments while reducing the amount of tax evaded.[5]

However, suppose that tax rate and tax ceiling variations are interrelated. That is, suppose that

$$t = \Theta(c), \qquad (13)$$

where tax rate adjustments to tax ceiling changes are carried out either through t_e or t_r (but not through both). This yields

$$\frac{dL^*}{dc} = -\frac{ct(1-p)U'(\pi^{nd})}{\Omega}[tK-t_eN + \Theta'c(K-H)]R_A(\pi^d) - [tL-t_eN + \Theta'c(L-H)]R_A(\pi^{nd})\}, \qquad (14)$$

where $H = N, 0$ if t is adjusted through t_e or t_r, respectively. The interesting case to examine is that where a change in c is "compensated" by an equal-percentage and opposite direction change in t so as to keep the overall tax liability per worker, tc, unchanged. This implies that $\theta' = -t/c$, which, substituting into (14) reduces the coefficients of $R_A(\pi^d)$ and $-R_A(\pi^{nd})$ into t_rN when t is adjusted through t_e, or into $-t_eN$ when adjustment is carried out through t_r. Consequently, the sign of (14) will be positive in the former case and negative in the latter. A "compensated" increase in the taxable payroll ceiling would thus increase declared employment and tax payments, tcL, in the former case but decrease it in the latter. The amount of tax evaded would change in the opposite direction, that is, decrease in the former case and increase in the latter, since $d[tc(N-L)]/dc = Nd(tc)/dc - d(tcL)/dc$, the first term of which is zero.

The results obtained so far have been derived under the assumption that actual employment is predetermined. However, when actual employment becomes endogenous, it responds, as implied by eq. (6), to variations in t_r and c. Thus, with the exception of an independent change in t_e (eqs. (7) and (8)), all other tax parameter variations discussed above will now produce an additional (indirect) effect on declared employment through its dependence on N. Eq. (10), for example, will now include the additional term $(dL^*/dN)(dN^*/dt_r)\phi'$, which is positive, given $\phi'=-1$, since $dL^*/dN = 1$ at $N=N^*$ and $dN^*/dt_r = c/V''(N)$. The sign of (10) will thus become ambiguous. Similarly, one can show that the indirect effect on L^* will be of an opposite sign to the direct effect for the rest of the tax parameter variations examined, so that the predominance of unambiguous sign implications arising when actual employment is predetermined will be converted into a predominance of ambiguities.

IV. EMPLOYER'S VERSUS EMPLOEES' TAX EVASION

Consider now an alternative tax collection system where the responsibility for tax payments is delegated to the employees. That is, suppose that instead of having to withhold the employees' share of payroll taxes, the employer hands his own share over to the employees. Each employee must then remit to the government the overall tax due by filing a return accompanied by his employer's statement of actual earnings. Clearly, evading payroll taxes would then be possible only by avoiding filing a return altogether. Considering this possibility, each employee's net earnings if his avoidance is not detected, I^{nd}, would be

$$I^{nd} = w + t_rc, \tag{15}$$

while if his avoidance is detected, net earnings, I^d, would be

$$I^{d} = w + c(t_r - \delta t). \tag{16}$$

Complying with the filing requirement would, however, ensure that net earnings, I^m, are

$$I^{m} = w - t_e c. \tag{17}$$

Suppose now that employees are risk-averse, that each employees' utility function, u, is defined on net earnings only (the volume of employment hours is predetermined, by assumption, by the employer) and that all employees associated with a given employer have identical tastes. Suppose also that a dishonest employee would face the same probability of detection currently faced by his employer. Each employee would then decide against filing a return if $Eu(I) = (1-p)u(I^{nd}) + pu(I^{d}) > u(I^{m})$. Approximating $u(I^{nd})$ and $u(I^{d})$ by second-order Taylor expansions around $u(I^{m})$, the non-filing condition becomes[6]

$$\frac{2(1-p\delta)}{1 - p\delta(2-\delta)} > \frac{tc}{w-t_e c} R_R(I^{m}), \tag{18}$$

where $R_R(I) = -u''(I)I/u'(I) > 0$ is the Arrow-Pratt relative risk-aversion measure, which will be assumed, as is often accepted, to be of the order of unity.[7]

While $1-p\delta>0$ is a necessary and sufficient condition for the employer to underreport his actual employment level, (18) implies that it is a necessary yet not a sufficient condition for the employee to avoid filing a return. As intuitively expected, the incentive to file would be greater the higher the law enforcement parameters p and δ, but also, and contrary to intuition, the higher the payroll tax parameters t_e, t_r and c. The possible explanation for this implication is that the increase in the cost of filing associated with higher tax parameters (increased taxes due) is more than offset by the increase in the cost of non-filing (expected penalty). However, setting $c=w$ and $t_e=t$, so as to increase the right-hand-side of (18) to its highest level possible, one obtains $t/(1-t)$. Since the overall payroll tax rate, t, is not likely to reach 50%, $t/(1-t)$ must be less than 1/2. On the other hand, the reasonable values of the law enforcement parameters, considering the acceptable norms of punishment and the law enforcers' resource constraint, are not likely to exceed $\delta=2$ and $p=1/4$. This implies that the left-hand-side of (18) is at least unity. Hence, non-filing would tend to dominate, and the entire payroll taxes due would probably be evaded. Contrary to Yaniv's (1988) and Hagedorn's (1989) finding that the withholding system might generate incentives for greater evasion of income taxes than that arising under self-declaration, we conclude here that as far as payroll taxes are concerned, the current system seems to be a better means for ensuring that less taxes escape the tax collector.

IV. CONCLUDING REMARKS

We have examined the qualitative implications of independent and interrelated tax parameter variations on the payment and evasion of payroll taxes, as well as the evasion implications of delegating the responsibility for tax collection to the employees. Several directions for future research immediately suggest themselves. One is to extend the model to take account of profit tax evasion. It is probable that employers who underreport their payroll also underreport their revenue (otherwise their profit tax obligations increase). Another possible extension is to allow detection to be the result of workers' exposure to a contingency covered by social security schemes. Underreporting payroll implies that some workers are not insured against such contingencies, a fact necessarily revealed upon their realization. The employer might then be obliged to bear the cost of compensations paid to workers by social security, a disturbing prospect that could adversely affect his evasion considerations. Also, the operational costs to the employer of handling payroll tax collection might be incorporated into the model, affecting possibly the amount evaded if being assumed to vary with declared employment. Finally, while an interesting implication of the comparative static analysis is that tax payments will be maximized and evaded taxes minimized if the overall tax liability is solely borne by the employer, maximum revenue might not be the government's main objective. The socially preferred overall payroll tax, its division between the employer's and the employee's shares, as well as the payroll ceiling per employee, must all be determined within an appropriate framework of optimal taxation.

F O O T N O T E S

[1]This is so since an interior optimum requires that $\partial[EU(\pi)]/\partial L < 0$ at $L=N$ (notice that $U'(\pi^{nd}) = U'(\pi^{d})$ at that point).

[2]This simple result stems from the fact that the joint derivative of $EU(\pi)$ with respect to L and t_e (determining the numerator of (7)) is linearly related to the second-order derivative of $EU(\pi)$ with respect to L (determining the denominator).

[3]I owe this interpretation to Rolph Hagedorn.

[4]Since (7) is positive, the last result implies that if N is fixed, the employer must also respond positively to an independent change in his own tax rate. Indeed, totally differentiating (4) with respect to L^* and t_r yields, holding N constant

$$\frac{dL^*}{dt_r} = -\frac{c^2t(1-p)U'(\pi^{nd})}{\Omega}[KR_A(\pi^d) - LR_A(\pi^{nd})] > 0, \qquad (7')$$

which is analogous to Yitzhaki's (1974) result concerning a tax evader's response to a change in the income tax rate.

[5]The last result, implied by (12), is obtained by substituting $D = -c^2t^2(1-p)U'(\pi^{nd})[R_A(\pi^{nd}) + (\delta-1)R_A(\pi^d)]$ into (11), making use of the first-order condition (4).

[6]Notice that $I^{nd} = I^m + tc$ and $I^d = I^m - (\delta-1)tc$. Notice also that the denominator of (18) is positive, since $1 - p\delta(2-\delta) = 1-p + p(1-\delta)^2 > 0$.

[7]For example, the frequently applied logarithmic utility function, $u(I) = \ln I$, implies that the relative risk-aversion is identical to one.

R E F E R E N C E S

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